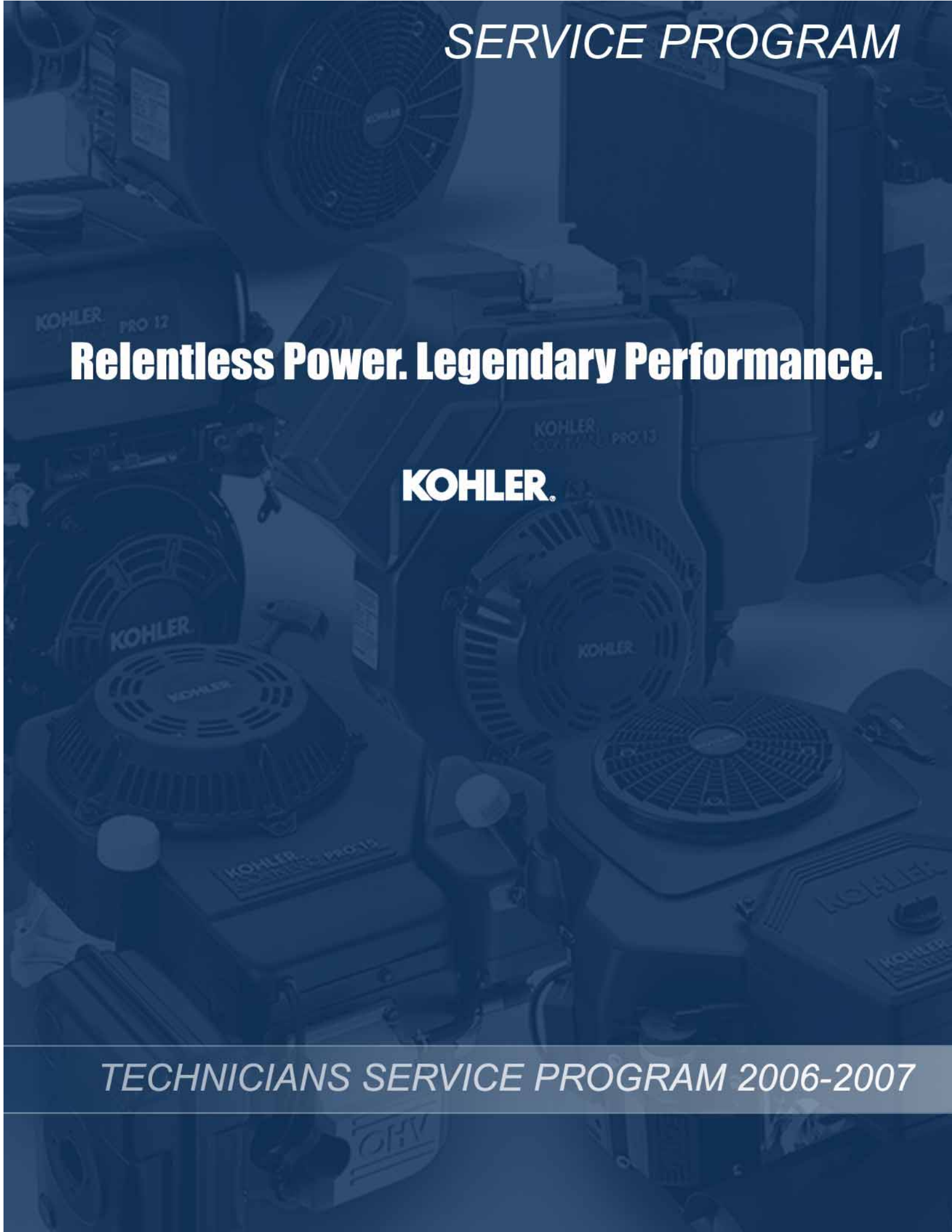




SERVICE PROGRAM

Relentless Power. Legendary Performance.

KOHLER.

TECHNICIANS SERVICE PROGRAM 2006-2007

Table of Contents

Section 1 – EFI	Page No.
Installation Instructions TT-5109	5
New Malfunction Indicator Light	5
New Primary High-Flow Fuel Filter	5
Stainless Steel Ground Eyelets	6
Service Pack Download SP1	6
USB Adapters	6
New Jump Start Hang Tag TT-5177	7
LH775 Overheating - Walker	7-9
 Section 2 – Command Twin	
CH/CV750 Rough Running Issues SB-280/TT-5176.....	11
CV Smoking on Start-Up	11
Improved Oil Pressure Switch 25 099 27-S	11
Improved Breather Hoses	12
DSAI Ignition System	12-13
Oil Coolers Replaced with High-Flow Fan.....	13
Introducing Aluminized Muffler & Heat Shield	13
Connecting Rod Design Changes.....	14
Miller Electric/Hobart R&R Procedure	14
Kohler/Miller Dealer Match Program	15
New CH750 Low-Profile Air Cleaner	15
CV Oil Pan Gaskets	16
 Section 3 – Command Single	
CV Air Cleaner Change	17
Starter Failures on Compressor Units.....	17
Improved CV Breather Hose	17
 Section 4 – Aegis	
Oil Dilution	19
 Section 5 – Courage Single	
New Balance Weight System	21
Improved Starter	21
New Grass Screen Guard	21
Broken ACR Stops	22
Broken Valve Keepers	22
ACR Operation	22
Improved Flywheel Fastener	22
 Section 6 – Courage Twin	
Improved Rocker Adjustment	23
New Muffler/Manifold Kit	23
Smoking - Hillside Operation or Under Load	23
New Fixed Guard/Housing Assembly	23
Teardown and Reassembly CDs & DVDs	24
Courage PRO Twin	24

Section 7 – COMMAND PRO 34, 36, 38

Introducing COMMAND PRO 34, 36, 38	25
--	----

Section 8 – Miscellaneous

Improved Breather Hoses	27
Low-Permeation Fuel Line, Bulk Roll	27
Exhaust Studs Removed	27
K-Series Anti-Dieseling Solenoid	27
Change in Kohler Special Tools Program	27
Kohler PLUS Update	28
Factory School Dates	29-30

Section 9 – Warranty/Re-Sign

New Warranty System for 2007	31
Carburetor Replacement Evaluation Form	31-32

Section 10 – Bulletins

Parts Bulletin 228 - Change in Kohler Special Tools Program	33-34
Parts Bulletin 233 - DSAM and Flywheel Compatibility (for reference only - no revisions)	35
Parts Bulletin 244 - Cylinder Head Service Kits for Command Twin Engines	36
Service Bulletin 240 - Damaged Main Bearings	37-38
Service Bulletin 276 - Carburetor Replacement Policy	39-40
Service Bulletin 279 - Cracking/Deteriorating Molded Style Breather Hoses	41
Service Bulletin 280 - CH/CV750 Momentary Sputtering, Interrupted Operation on Varying Terrain	42

Section 11 – Service Program Test

Directions	43
Service Program Test Questions	44-50
Answer Sheet	51

Section 1

EFI

Installation Instructions TT-5109

When repowering or installing a Basic EFI engine on new equipment, please use TT-5109. This installation guideline has been developed for both air and liquid-cooled EFI engines.

Helpful tips include:

- Proper mounting of components
 - ECU
 - Relay
 - Fuse
 - MIL
- Color code wiring details
- Fuel system layout information
- Battery cable size guideline

New Malfunction Indicator Light

In 2006, the Malfunction Indicator Light (MIL) was added to the component list included with each Basic EFI engine. For engines built before that time, or as a replacement, the incandescent MIL is now listed in the Accessories Catalog under **Part No. 25 352 19-S**.

New Primary High-Flow Fuel Filter

The CH745-0010 and CV745-0007 are Basic EFI engines. Installation Instruction (TT-5109) requires the use of a 75-150 micron fuel filter with fittings/barbs for 5/16 in. I.D. fuel line. A new 80 micron filter is now available from Kohler under **Part No. 24 050 12-S**.



Malfunction Indicator Light

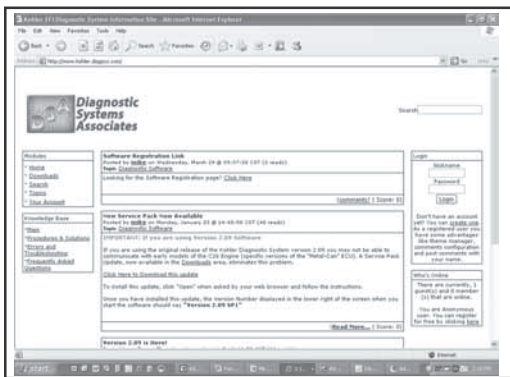


New Primary High-Flow Fuel Filter

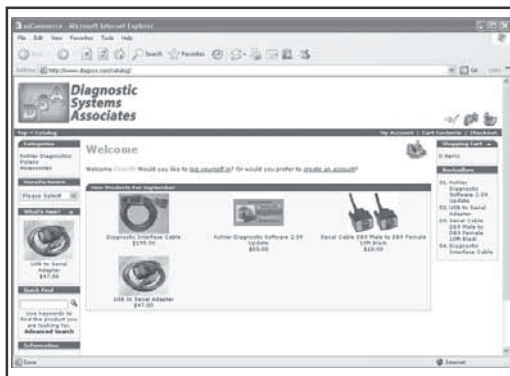
Stainless Steel Ground Eyelets

There have been reports of stainless steel eyelets found in both the 24 452 01-S and 24 755 134-S kit with recent date codes. The correct eyelets should be tin-plated copper and can be identified by scratching the surface with a file. The silver-colored tin plating can easily be scratched to reveal the copper material underneath. Also, the stainless eyelets will not accept solder.

If you have received these mispackaged parts, file a defective parts claim and reorder the 24 452 01-S terminal.



Software Update Page



USB Adapter Order Page

Service Pack Download SP1

The latest version of the EFI Diagnostic Software package is version 2.09 SP1. If you have version 2.09 without the **SP1**, you will need to install this service pack for proper communication with the older MA 1.7 (metal case) ECUs. The Service Pack is a free download and can be found at **www.kohler.diaagsys.com**. To install this update, click "Open" when asked by your web browser and follow the instructions.

USB Adapters

The EFI Diagnostic Software includes an interface cable with a serial port connector. Software Version 2.09 has been modified to function with some USB serial adapters. Although earlier diagnostic software versions may function, there may be situations where communication problems arise.

The vast majority of department store USB serial adapters (including Belkin, Bafo, Targus, Radio Shack, etc.) will not work with the Kohler EFI Diagnostic Software. The alternatives are:

Sealevel Systems 2105 Adapter, \$79

Requires some configuration to work properly.
<http://www.sealevel.com>

Keyspan USA19hs, \$39

Requires some configuration to work properly.
<http://www.keyspace.com>

DSA 04-10001, \$47

Requires some configuration to work properly. Guaranteed to function with Kohler 2.09 software. The only adapter supported by DSA. **<http://diagsys.com/catalog>**

Plan ahead and install the software to make sure everything is working properly. Test and become familiar with the diagnostics before you find yourself in a bind with the customer's unit.

New Jump Start Hang Tag TT-5177

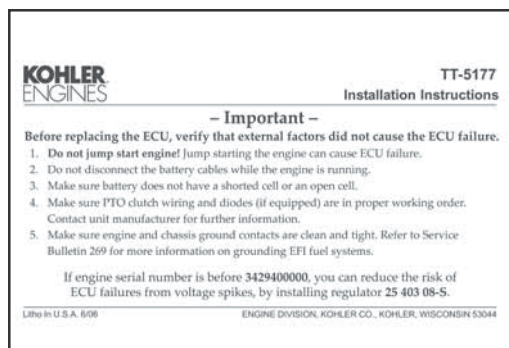
A new hang tag has been created to warn against the dangers of jump starting EFI engines. The hang tag is attached to the ECU and must be physically removed before installation. The technician should then pass the information on to the customer, or attach the tag to the equipment.

LH775 Overheating - Walker

There have been isolated reports of overheating caused by the fan not running, or running at a low speed. When the key switch is operated, the ECU turns the fan **on** as coolant temperatures reach 175°F. When coolant temperature drops to 160°F the fan shuts **off** through the ground circuit. If the fan is not operating, inspect the wires between the fan and the ECU to ensure a good connection. If the connection is good, examine the ECU for any damage and replace if necessary.

The **high** and **low** fan speeds are controlled by a temperature switch in the radiator of the application. If the fan will only work on one speed, inspect the wiring and sensor on the unit. See the following pages for the Walker wiring schematic and troubleshooting procedure to identify the problem.

Walker dealers can also access this information by logging on to www.service.walkermfg.com.



New Jump Start Hang Tag

WALKER MOWERS

FAN CONTROL MODULE FUNCTION AND OPERATION

Function: Controls fan motor direction and duration of rotation

- ♦ Pulls air across radiator for 4 minutes
- ♦ Stops for 2 seconds
- ♦ Pushes air across radiator for 6 seconds (to clean the screen)
 - Red wire supplies +12v
 - Black wire → ground
 - Orange/White wire supplies +12v from ignition switch to start module cycling
 - Brown and Gray wires reverse polarity controlling the fan direction of rotation
- ♦ A coolant temperature switch, resistor and relay in the fan circuit controls the fan speed
 - Normal operation relay D is not energized
 - Position 30 → 87A
 - Resistor → positions 87 and 87A reduces voltage to fan to 8 volts (normal speed)
- ♦ If coolant temperature reaches 205° F (96° C)
 - Temperature switch → ground
 - Green wire on temperature switch → relay D position 86
 - Relay D energizes
 - Position 30 → 87 bypassing resistor
 - Voltage to fan goes to 12v (fast speed)
- ♦ When coolant temperature drops below 205° F (96° C)
 - Ground at the temperature switch is removed
 - Relay D is not energized
 - Position 30 → 87A
 - Fan returns to normal speed

TIME-DELAY MODULE FUNCTION AND OPERATION

Function: Provides a 2 second delay before shutting down the engine when the operator comes off the seat and the PTO is engaged and/or the FSC is forward

- ♦ Black wire → to chassis ground
- ♦ Brown wire → to chassis ground via the Brown/White wire from the FSC switch and Black wire from relay C position 30 (N.C.)
- ♦ FSC in neutral the switch is closed
- ♦ Relay C is not energized if the PTO is not engaged
- ♦ Gray (model C/T), Yellow (model D) is the trigger wire (+12v will set the 2 second timer)
 - With the operator on the seat +12v is applied to Gray or Yellow
- ♦ Green wire goes to ground energizing relay B
 - Relay B energizing removes ground to the ECU allowing engine to be started
- ♦ Ground can be removed at the Brown wire
 - FSC moved forward
 - PTO engaged - relay C energized
 - Green wire remains at ground
- ♦ Operator comes off seat
 - +12v interrupted by seat switch
 - Time Delay begins timing out
- ♦ Operator back on seat before Time Delay times out
 - +12v returns to Gray wire
 - Engine continues to run
- ♦ Time Delay times out
 - Green wire loses ground
 - Relay B is not energized
 - Ground to ECU via White wire
 - ECU disrupts +12v to engine ignition and fuel pump
- ♦ Engine stops

IGNITION SWITCH CIRCUITS	
OFF	G + M
START	B + A / S1 + S2
RUN	B + A

S2 = START / ACCESSORY CIRCUIT
M = MAGNETO GROUND CIRCUIT

A = ACCESSORY CIRCUIT

J1 = #1 FUEL INJECTOR

J3 = THROTTLE POSITION SENSOR

J3 = VOLTAGE SENSUR
J5 = RECTIFIED ATOM / RECTIFIED

140 = #1 IGNITION COIL

J12 = #1 IGNITION COIL

J14 = IGNITION COIL GROUND

RELAY-A

Off	30 + 87A
-----	----------

PTO ON	OPEN
--------	------

START DEL AV

START	30 + 87
-------	---------

NON	OPEN
-----	------

FAN INTERRUPT RELAY

START	OPEN
-------	------

FIGURE	20 + 01A
--------	----------

FARMER'S OUTLOOK

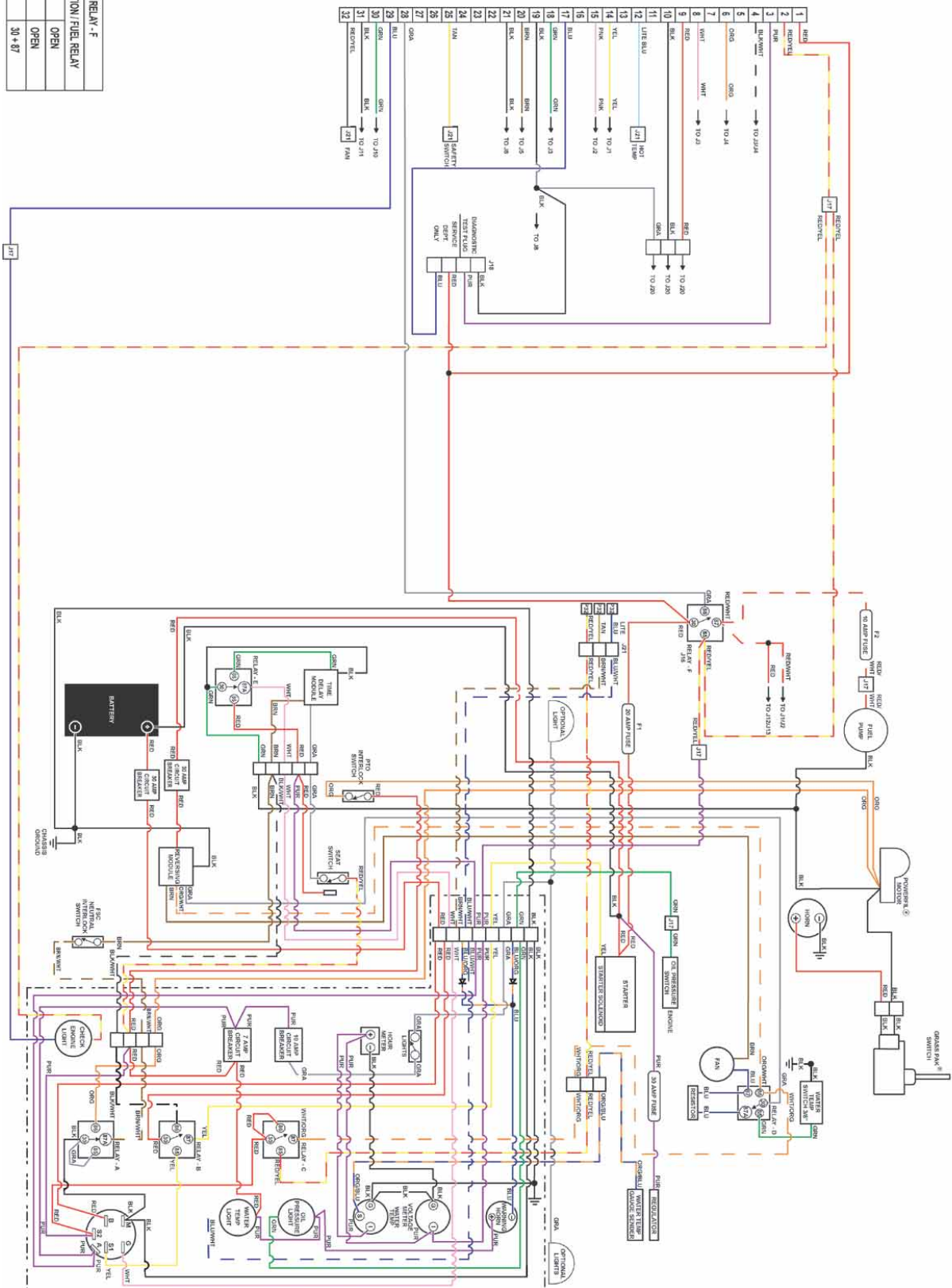
OFF	30 ÷ 87A
-----	----------

9401	9401
------	------

DELAVER

DELAY RELAY

START	OPEN
-------	------



Section 2

Command Twin

CH/CV750 Rough Running Issues SB-280/TT-5176

A new air cleaner elbow has been developed for the CH/CV750 engines built before Serial No. 3618800001. This modification extends the bowl vent up into the elbow, improving performance on rough terrain, hills, and abrupt turns. The elbow kit part number is 24 054 19-S and must be used with the new gasket.

The kit contains:

- Air cleaner elbow
- Gasket
- Clamp
- TT-5176

CV Smoking on Start-Up

Field reports of smoking at start-up have been reported specifically on Command vertical engines. As this topic was covered last year, many cases have been cured by identifying:

- Over choke
- Improper shutdown
- Breather reed not seating

In cases where the problem continued, some dealers had noted as much as a teaspoon of oil found above the piston when the head was removed. Testing found that oil settling from the bore and ring grooves collected in the combustion chamber.

New pistons have been redesigned to significantly reduce the amount of oil that can get past the rings and into the combustion chamber. The most notable change is found in the oil ring groove where the oil slots were significantly reduced. These pistons should be available in the fourth quarter of 2006.

Improved Oil Pressure Switch 25 099 27-S

In response to some field complaints, we have replaced the 25 099 24-S with the improved 25 099 27-S oil pressure switch. If testing confirms the unit has correct oil pressure (closed), even though the warning light or horn indicates low oil pressure (open), remove and replace with the improved switch.

KOHLER ENGINES	Service Bulletin		NO. 280
			MODEL CH/CV750
	DATE ISSUED	DATE REVISED	
	7/06	6/94	

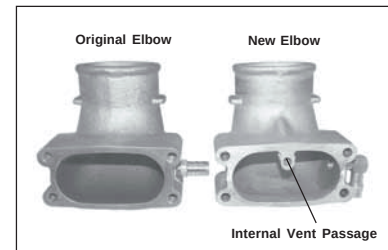
Momentary Sputtering or Interrupted Operation on Varying Terrain

We have investigated various reports of momentary engine sputtering, interrupted operation, and loss of power on CH/CV750 engines. This has occurred in mowing applications over hilly, rough terrain but has also occurred on level ground when making hard, fast turns.

This condition was found to occur as a result of raw fuel exiting the carburetor bowl vent into the elbow and drawing back directly into the carburetor venturi. This resulted in excess fuel being fed until the terrain conditions changed or the extra fuel was consumed.

To alleviate this condition a new elbow and gasket kit, Part No. **24 054 19-S** is now available from your normal source of supply. The new elbow has a special internal vent passage to contain and direct any fuel that may be discharged so it will not impede operation. The new elbow and gasket must be used together for proper operation. See Figure 1. Installation time is 1/2 hour, and warranty may be filed where applicable.

All CH750 and CV750 engines Serial No. 3618800001 and higher contain the new parts from the factory.



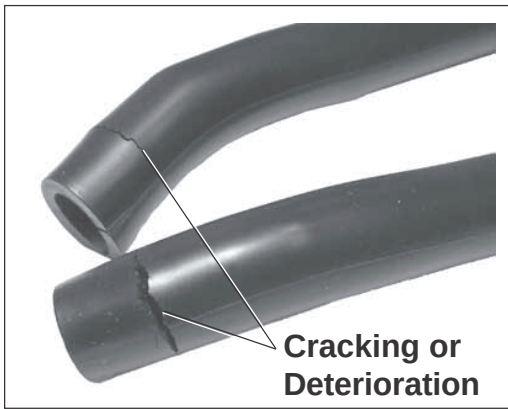
Service Bulletin 280



Old Style Piston



New Style Piston



Cracks in Breather Hoses

Improved Breather Hoses

Recent reports of cracked or deteriorating breather hoses on Command, Aegis, and Courage engines have prompted a material change. A previous material change in 2004 has been found to be inadequate in some applications for long term reliability.

New hoses with improved ozone protection have been developed and carry new part numbers. They also have the part number printed in white for easy identification. Please refer to the chart found on Service Bulletin 279 in Section 10 for the cross reference to the new breather hose part numbers.

All engines should be routinely inspected for deteriorating or cracking breather hoses. Replace any deteriorated or cracking hoses with a new breather hose. Only file a warranty claim if the engine is within the warranty period.



DSAI Module

DSAI System

Digital Spark Advance Ignition (DSAI) has been developed to replace the current DSAM and fixed timing CDI systems.

Features include:

- Designed to meet or exceed Kohler specifications
- Fewer system parts (two vs. three) than DSAM
- 12-Volt inductive microprocessor controlled ignition modules (5-16 VDC operating voltage)
- Timing curves for specific engines (C740 & C750) and fuel type (gasoline & LP/NG)
- Output at lower engine speeds (100 RPM vs. 200 RPM)
- Increased spark duration and spark energy over current CDI/DSAM (improved cold starting capability)
- Improved combustion due to longer spark duration
- No air gap adjustment (mount and go)
- Fits current Kohler V-twin engine mounting
- Works with current C740/C750 production flywheel & magnets
- Low voltage signal (4 volt square wave) at kill tab for OEM use (hour meter, tachometer, safety control) as compared to DSAM 300 volt pulse
- Average DSAI current draw compared to DSAM current draw of 0.085 amps (all cases):
 - 1.5 amps starting
 - 1 amp operating
 - 5 milliamps 2/engine **OFF** (key switch **ON**)
- Battery ignition system that offers a 12-volt shut down and/or ground to kill
- Sleep mode
 - If key is left on, ignition switches to sleep mode and only draws 5 milliamps.

- Easy service replacement
 - Mount and go with no air gap setting required
- Improved engine cosmetics
 - No external control box

Kohler will continue to offer the SAM Ignition Modules as replacement parts.

Oil Coolers Replaced with High-Flow Fan

During development of the Command 750, the design engineers developed a new, more effective, high-flow cooling fan. When tested on other Command Twins, this new design was more effective in reducing internal temperatures than the cast-aluminum oil cooler. As a result of that testing, the engine specs which used the cast oil cooler have been revised to replace the cooler with the high-flow fan.

Introducing Aluminized Muffler & Heat Shield

Kohler is now making aluminized canister mufflers and heat shields available for Aegis and Command Twins.

As shown, only two mufflers and heat shields are being introduced at this time: one for LH/CH twins and one for LV/CV twins. Both are the most popular versions with oil filter side outlets. Black painted versions of these parts will continue to be available. The aluminized parts are competitively priced, in part to help Marketing gauge demand.

Testing in the field and in Kohler labs has shown the aluminized parts to be superior in rust-resistance and longevity. We look forward to hearing positive feedback from customers using the aluminized mufflers and shields.

LH/CH Twins - Filter side 5" Canister & Shield (Shield required on 25 HP and higher models)

24 786 26-S Kit, aluminum canister muffler
(like 24 786 11-S)

Includes:

24 068 57-S Muffler (like 24 068 18)

24 314 50-S Shield (like 24 314 04)

LV/CV Twins - Filter side 4.5" Canister & Shield

24 068 58-S Muffler (like 24 068 29)

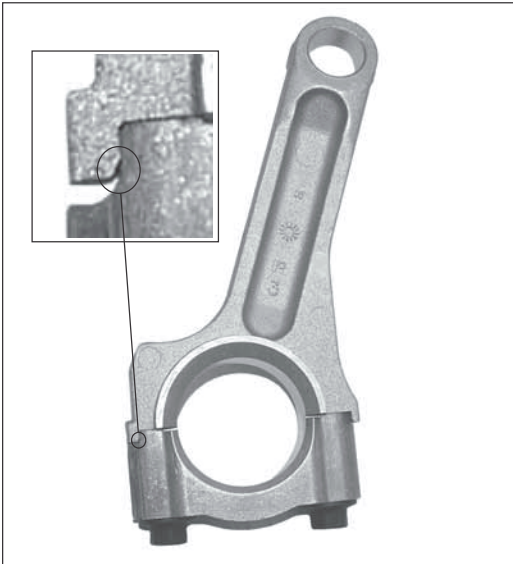
24 314 51-S Shield (like 24 281 13)



LH/CH Aluminized Muffler



LV/CV Aluminized Muffler

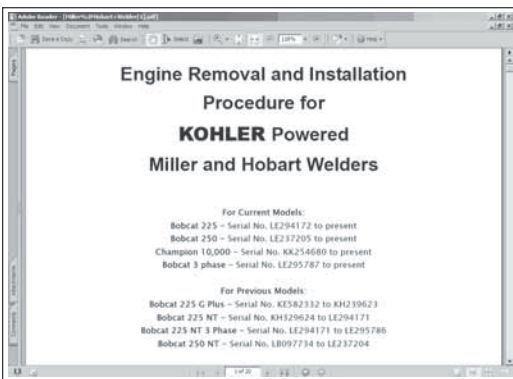


Connecting Rod Chamfer

Connecting Rod Design Changes

Three design changes have been made to the Command and Courage Twin connecting rods.

1. The small chamfer on the edge of the locking step was changed from 45° to 30°. The chamfer is small but extremely effective as the cap is easier to assemble and seat. The improved seating provides better torque retention on the bolts.
2. The dies for making the shank and cap were modified to mold in the chamfer around the crankshaft bore, eliminating a machining operation.
3. The cap is now made from powdered metal, a molding process that provides better oil retention.



Miller Electric R&R Procedure

Miller Electric/Hobart R&R Procedure

As a joint effort, Kohler Engines and Miller Electric/Hobart have put together a complete procedure to remove and reinstall the welding generator engine. These instructions are available online with color pictures.

To locate the procedure online:

1. Go to www.kohlerplus.com and login using your Kohler dealer warranty number and password.
2. At the **Product Catalog** page, click on **Service Literature**.
3. From **Associated Documents**, select **Miller/Hobart Welder** to download a 1.5 MB PDF file.

Kohler Engine dealers with specific engine-related technical questions should contact their Central Distributor.

Kohler Engine dealers with specific welder-related technical questions should contact the Miller Electric/Hobart Service Line at (920) 735-4505.

Kohler/Miller Dealer Match Program

This program is designed to allow Kohler dealers to be matched with Miller dealers to provide our mutual end customers with a more seamless service experience.

- Miller Electric supplied Kohler with a list of Miller dealers.
- Kohler distributed sections of this list to the appropriate Central Distributor.
- Kohler Central Distributors were able to match Kohler Dealers to 727 Miller dealers, and in some cases, signed the Miller dealer as a Kohler dealer.

Today when a customer takes their unit to a Miller dealer with an engine concern, the Miller dealer will either be able to service it himself or suggest a predetermined Kohler dealer to do the job.

New CH750 Low-Profile Air Cleaner

In an effort to deliver more power into more applications, Kohler has developed the low-profile air cleaner for the CH750. The low-profile air cleaner reduces the overall height by 3-1/4". It is currently available in two basic spec engines.

CH750-0005

- Fixed Grass Screen Guard
- 25 Amp alternator, regulator

CH750-0006

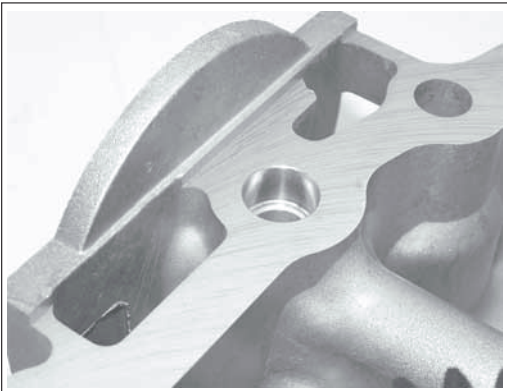
- Crankshaft - 1.125" (28.5 mm) diameter x 4.0" (102 mm) PTO length, 0.25" (6 mm) keyway, drilled and tapped 1.5" (38 mm) deep, 7/16-20 UNF
- Engine controls - Keyswitch, throttle, and choke controls
- Fixed grass screen guard
- 25 Amp alternator, regulator



CH750 Low-Profile Air Cleaner



**Pan With Oil Transfer Groove
(Use RTV)**



**Pan Without Transfer Groove
(Use Gasket)**

CV Oil Pan Gaskets

When the CV25 was developed and tested, Kohler Engineering determined a gasket would be necessary to properly seal the block on the oil pan.

In August 2004, approximately 20 specs below 25 HP were given the oil pan gasket feature. This oil pan does not include the machined O-Ring groove in the oil transfer on the gasket surface, as used on the RTV-style pan. In some cases, the engine spec was not changed when this feature was added and has led to confusion when servicing the oil pan.

To determine whether a CV Twin uses a gasket or RTV, check the oil pan gasket surface near the oil filter pad.

- Oil pans with a machined groove for an O-Ring are designed for the RTV seal and will not use a shim on the crankshaft.
- Oil pans without the machined groove should use a gasket and a shim on the crankshaft. (The gasket includes the alignment pins.)

Section 3

Command Single

CV Air Cleaner Change

Proper assembly of the air cleaner element to the base is necessary to ensure a complete seal. To help make sure the element is installed correctly, Kohler has modified the air cleaner base with higher profile tabs for ease of proper assembly.

Starter Failures on Compressor Units

We continue to receive numerous calls for starter failures on compressor applications. In most cases, these starters have been overheated. Field investigation has revealed the following:

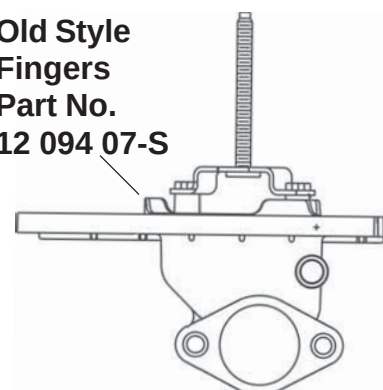
- 1) Insufficient grounding and wiring from the battery source (front of vehicle). Please ensure a minimum of 4-gauge cable is used.
- 2) Extended wiring harness for remote key switch locations. Please ensure key switch is located in close proximity to the by-pass/pop-off valve. This will allow load disengagement when starting the engine.
- 3) Faulty oil by-pass/Oil Sentry operation resulting in extended cranking times. Please ensure oil by-pass/Oil Sentry system is operating properly.

A proactive review of the above steps will prevent future problems and denied warranty claims.

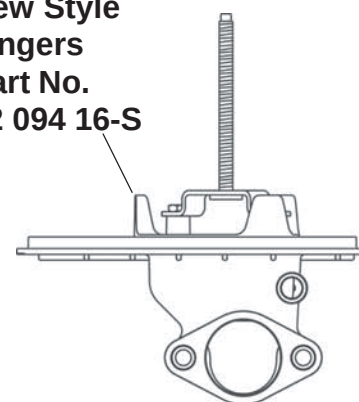
Improved CV Breather Hose

Along with the material change for improved ozone protection, (see Service Bulletin 279), the valve cover end of the breather hose has been modified for a tighter fit. This will reduce the chance of the hose being accidentally pulled out. The new part is planned for release in the last quarter of 2006 under **Part No. 12 326 30-S**.

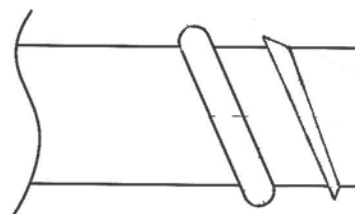
**Old Style
Fingers
Part No.
12 094 07-S**



**New Style
Fingers
Part No.
12 094 16-S**



CV Air Cleaner Change



Improved Breather Hose

Section 4

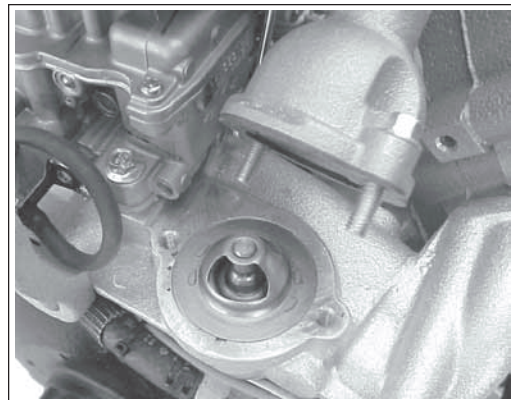
Aegis

Oil Dilution

There have been some reports of fuel causing oil dilution on some applications of the LH640-775. This excess fuel in the oil is due to incomplete fuel vaporization caused by the relatively cool cylinder walls in the liquid-cooled engine family. Liquid fuel present on the cylinder walls can work past the rings to the oil sump.

Applications with light loads may not work the engine hard enough to warm the engine sufficiently. In this case, Kohler offers a 190°F thermostat to replace the standard 175°F. The warmer 190°F thermostat can be used in all applications and ordered with **Part No. 66 453 02-S**. Some applications will not exhibit this problem. Replace the thermostat only as required.

The correct spark plug for all Aegis engines is a Champion® RC14YC (66 132 01-S) or equivalent. Some cases of oil dilution have been noticed after replacing the RC14YC with Command type RC12YC spark plug. Testing has shown that the RC14YC runs approximately 20% warmer than the RC12YC spark plugs.



Aegis Thermostat

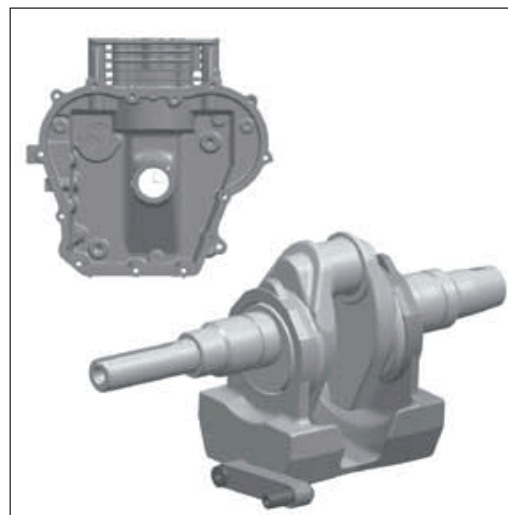
Section 5

Courage Single

New Balance Weight System

The Courage balance weight system has been modified to use a link in place of the guide shoe to keep the weight in-line with the piston travel. Starting with Serial No. 3618005223, the engine block has an additional mounting boss inside to accept a press fit pin for mounting the new link to the current balance weight.

Part No. 20 755 04-S was developed to service the balance weights. The kit includes TT-5179 instruction sheet and components to service both the "guide shoe" design and the new "link" design.



New Balance Weight

Improved Starter

Reports of water causing starter failures have prompted a redesign of the drive end cap. This design adds slots allowing water to drain out of the cup area where the drive mechanism rests. Attempts to modify an existing cap will cause water to drain into the motor and cause early starter failure. The new starter can be ordered under **Part No. 20 098 05-S** or the drive end cap is available under **Part No. 20 227 01-S**.



Location of Starter Drain

New Grass Screen Guard

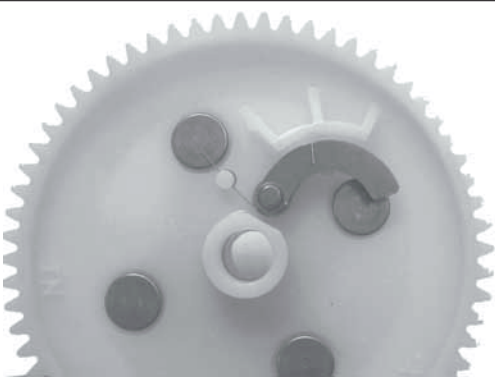
The grass screen guard is now available and listed in the Accessories Catalog under two part numbers. Engines below Serial No. 36145XXXX3 should use kit 20 755 11-S. This kit will include threaded inserts to install in the blower housing. Engines with Serial No. 36145XXXX3 and above should use kit 20 755 14-S. The newer blower housings have mounting bosses for easy installation.



New Grass Screen Guard



Broken ACR Stop



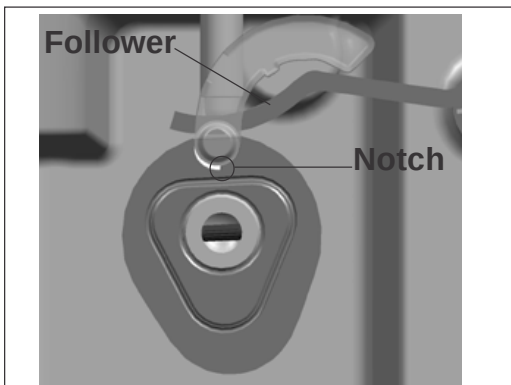
Improved ACR Stop

Broken ACR Stops

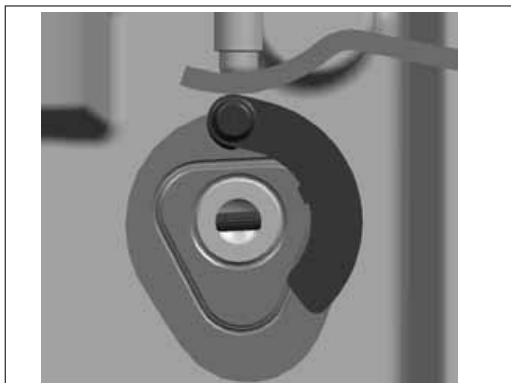
Kohler has experienced some ACR failures on Courage engines where the molded stop breaks off the cam gear allowing the flyweight to swing too far. A change has been implemented to improve the strength of this component. The new camshaft is Part No. 20 010 04-S.

Broken Valve Keepers

Kohler testing has found that broken ACR stops on the cam gear may cause valve keeper breakage. For any reports of broken keepers, be sure to inspect for broken ACR stops. Please contact your Central Distributor if you encounter any broken keepers not accompanied by a broken ACR.



ACR Open



ACR Closed

ACR Operation

Used only on the exhaust, the ACR mechanism is supposed to hang up or lock in a new camshaft if operated by hand. As odd as it sounds, this is the design intent.

There is a notch in the bore for the ACR lever that serves as a locking device. This lock ensures that the ACR is activated (closed) and ready for each start, no matter where the follower comes to rest when the engine is shut down.

Without the locking feature, the follower may deactivate the ACR as the engine is shut down. This will cause full compression during the next cranking attempt, and a possible starter stall.

Improved Flywheel Fastener

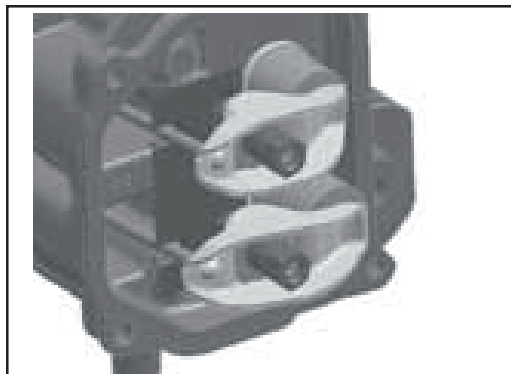
To increase flywheel retention, the flywheel fastener on the Courage Single has increased size from M10 to M12. With this increase in size, there is also an increase in torque to 96 ft. lb. (130 N·m).

The flywheel key has also been changed from the woodruff design to a straight key. The new fastener design will go into production at serial number **3635500003**.

Section 6 Courage Twin

Improved Rocker Adjustment

Kohler Engineering has redesigned the valve train to make tappet adjustment easier. The new system resembles the Courage single. A set screw is used to lock the adjustment made at the rocker arm pivot. The new system is expected to be in production the first quarter of 2007.



Improved Rocker Assembly

New Muffler/Manifold Kit

A Courage Twin muffler/manifold kit is now available as Part No. 32 786 01-S in the Accessories Catalog. The kit includes the muffler and 2 slip manifolds as well as the gaskets and nuts. The customer must provide the bracket for the unit frame. Parts will be serviced separately and can be ordered under the following part numbers:

- 32 786 01-S Muffler/Manifold Kit
- 32 068 01-S Muffler
- 32 164 01-S Manifold #1
- 32 164 02-S Manifold #2

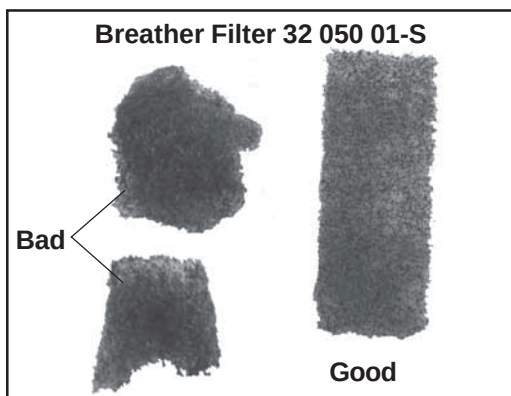


New Muffler/Manifold Kit

Smoking - Hillside Operation or Under Load

Some dealers have reported blue oil smoke on new engines when operated on a hillside or under load. Leakdown and crankcase vacuum look normal. Kohler called back some of these engines and found poorly installed or incomplete breather filters.

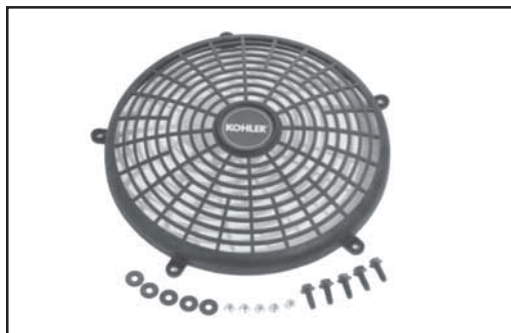
Before disassembling the engine to replace the breather filter, please make sure the leakdown and crankcase vacuum are normal, the air filter is not plugged, and all external breather components are assembled and operating properly.



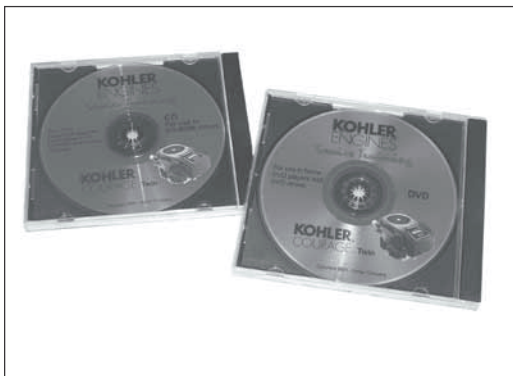
Breather Filter

New Fixed Guard/Housing Assembly

The new Courage Twin fixed guard is available in the Accessories Catalog as part of a blower housing assembly under Part No. 32 027 08-S.



Fixed Guard/Housing Assembly

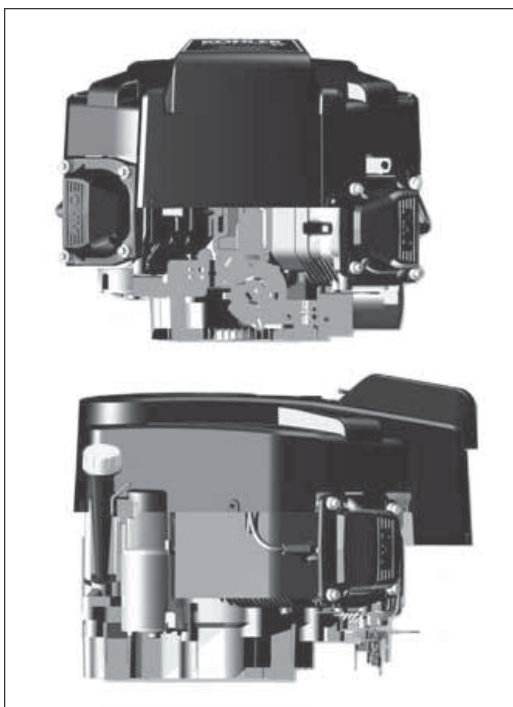


Teardown/Reassembly CD

Teardown and Reassembly CDs & DVDs

Training CDs & DVDs are available to become familiar with this product as customers begin to bring units in for service.

32 802 01	Courage Twin CD-ROM (\$4.95)
32 802 02	Courage Twin DVD (\$7.95)



Courage PRO Twin

Courage PRO Twin

Introducing the Courage PRO series of engines. As many OEMs offer product designed for high durability with low usage for large acreage estates, this series will fill the void between consumer and commercial, as a light-duty commercial grade engine.

Engine models include 20, 23, 25, and 27 HP.

Additional features and benefits:

- 60% larger air filter to meet the demands of dirty conditions.
- 60% larger oil filter for added assurance the oil is clean.
- Commercial PRO spark plugs for seasonal maintenance and dependable starting.
- Yellow service points for easy maintenance inspection.
- One Year commercial warranty for owner assurance.

Section 7

COMMAND PRO 34, 36, 38

Introducing Command Pro 34, 36, & 38

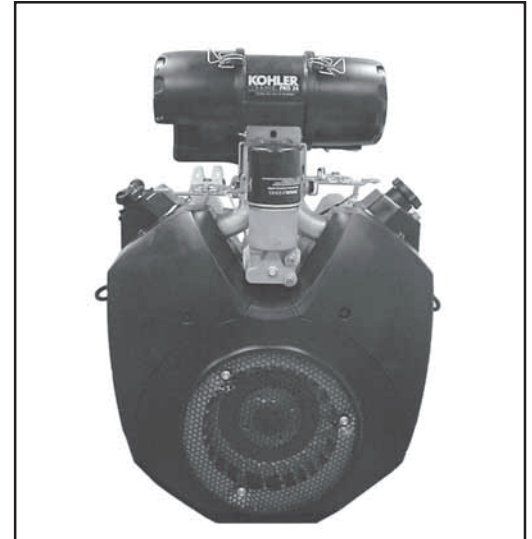
Available the first quarter of 2007 in both horizontal and vertical configurations, this engine has a 90 mm bore and 78.5 mm stroke for a total displacement of 999 cc.

Engine models include:

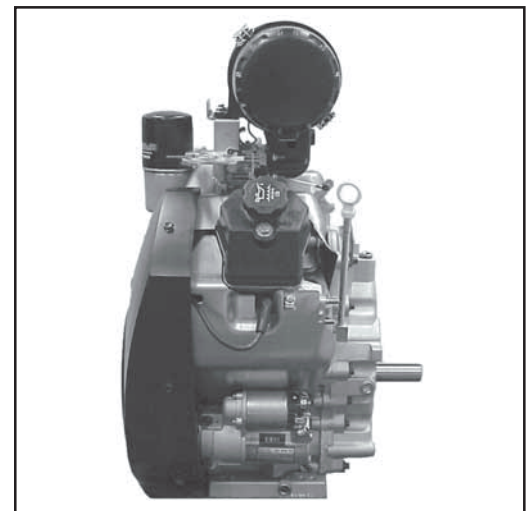
Model	HP
CH940	34
CV940	34
CH960	36
CV960	36
CH980	38
CV980	38

Major features include:

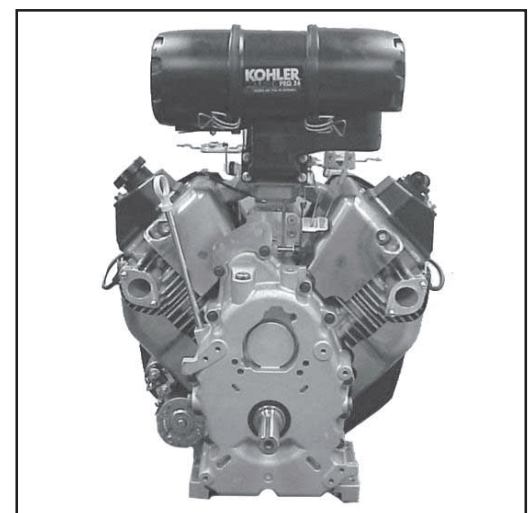
- ◆ Easy access heavy-duty air filter
 - Optional filter minder
- ◆ Top access oil filter with a self-draining design
- ◆ Removable access covers in the blower housing
- ◆ Integrated oil cooler
- ◆ Extended service intervals
- ◆ Large diameter oil drains
- ◆ Nylon cam gear
- ◆ Hydraulic valve lifters
- ◆ Fan blade spacing to minimize noise
- ◆ Identical mounting pattern to current Command series engines
- ◆ Vertical mounting allows for 90° rotation
- ◆ Will meet CARB tier III and EPA phase II regulations



Front View



Side View



PTO View

Section 8

Miscellaneous

Improved Breather Hoses

Recent reports of cracked or deteriorating breather hoses on Command, Aegis, and Courage engines have prompted a material change. A previous material change in 2004 has been found to be inadequate in some applications for long term reliability.

New hoses with improved ozone protection have been developed and carry new part numbers. Please refer to the chart found on Service Bulletin 279 in Section 10 for the cross reference to the new breather hose part numbers.



Cracks in Breather Hoses

All engines should be routinely inspected for deteriorating or cracking breather hoses. If the engine is within the warranty period, replace any cracked or deteriorated hoses with a new breather hose.

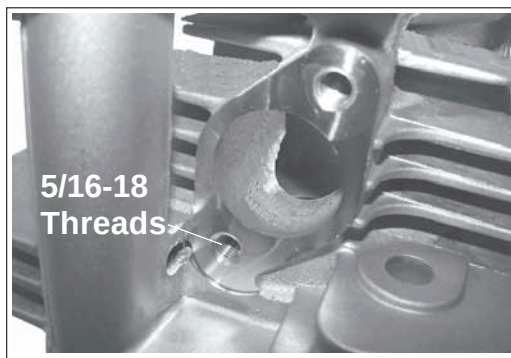
Low-Permeation Fuel Line, Bulk Roll

Low-permeation, fuel line is now available in 25' bulk rolls. The This 1/4" R-7 line is **Part No. 25 111 39-S**.

Exhaust Studs Removed

Starting October 2006 the exhaust studs were removed from the Courage Single and Twin cylinder heads. The tapped hole has also been changed from a metric thread to 5/16"-18 to accommodate the majority of OEMs.

Service heads will not use studs and will be supplied with two 5/16"-18 bolts. Instruction sheet TT-5183 has been written to warn against transferring or installing new metric studs into the new service head.



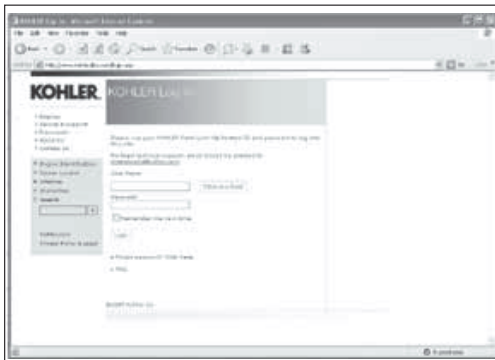
New Exhaust Stud Threads

K-Series Anti-Dieseling Solenoid

Solenoid 45 435 02-S used on K341AQS spec 71169 for John Deere has been discontinued both at Kohler and John Deere. A replacement solenoid can be found at NAPA under Part No. 2-2026.

Change in Kohler Special Tools Program

Kohler Engines, along with two outside suppliers will now be the primary sources for most of the special tools offered for engine servicing. Only those tools with Kohler Part Numbers will be available through Kohler Co. All other special tools are available directly from the supplier listed. See Parts Bulletin 228 in Section 10 for further information.



Kohler PLUS Login Screen

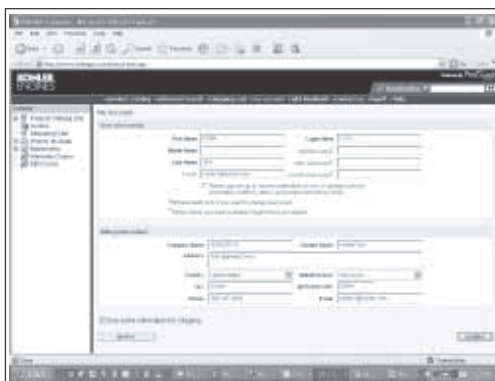
Kohler PLUS Update

We continue to receive numerous calls from dealers who either do not know how to log into the system, have forgotten their password, or do not realize that their warranty number has been changed.

Here are some tips to help ease the login process:

First-time users

1. Enter your
User Name: 11-digit Warranty ID
Password: kohler (no caps)
2. If you are prompted to install the ActiveX plugin, click **Install Components**. This process should take less than 1 minute.
3. Click **Yes** to each of the security warnings that follow.
4. At your Account screen, fill in the following fields
 - a. Name
 - b. Old Password
 - c. New Password
 - d. Confirm New Password
 - e. E-Mail
 - i. This should be a business email and viewable by more than one individual. Warranty Claims will go to this address.
 - ii. Please make sure that an **e-mail** address is entered, and not a website address.



Account Screen



Forgot Password Window

Forgot Your Password?

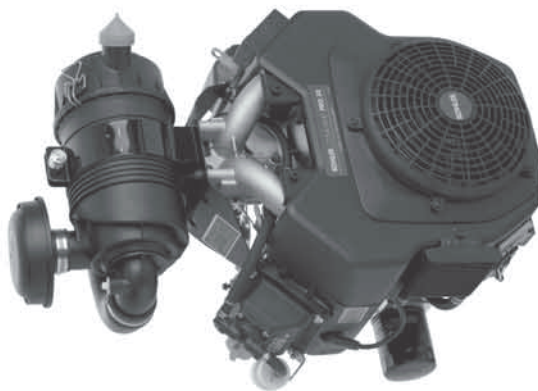
1. Before calling Kohler, click on the “Forgot Password” link on the main login screen.
2. Enter the e-mail address that is listed on your **Account** screen.
3. The system will send you a password within 5 minutes to the e-mail address you typed.
4. New Password **must be** typed exactly as shown in e-mail.
5. The new password will only allow you to login once. You will be prompted to change your password.

Hint: You must type your old password and your new password in *both* fields provided. Your old password is now the password you were sent.

KOHLER® ENGINES

Factory Schools 2006-2007

at
Kohler, WI



**Relentless Power.
Legendary Performance.**

Level I

The Level I course is designed to provide students with a working knowledge of Kohler air-cooled four-cycle engines and engine systems. It is assumed the students will have a basic understanding of small gasoline engines upon enrolling in the class. Information covered will include:

- Using Parts and Service Manual
- Use of Measuring Instruments
- Electrical/Ignition Theory
- Warranty Information
- Troubleshooting
- Failure Analysis
- Fuel Systems
- Engine Tear Down/Reassembly

Level I

2006-2007 Level I School Dates:

- December 4-8, 2006
- January 8-12, 2007
- August 6-10, 2007

Level II

The Level II course is designed for students who have completed a Level I course at Kohler, or at a central distributor, or have passed the Kohler certification test. The class size will be smaller to allow for more one on one instruction, and more hands-on activities.

Information covered will include:

- Electrical Systems – Ignition, Starting, Charging
- Fuel Systems – Gasoline, EFI, Gaseous
- Advanced Failure Analysis
- Tear Down and Reassembly Procedures
- Hands-On Diagnosis and Troubleshooting in a Variety of Areas

Level II

2006-2007 Level II School Dates:

- January 29 - February 2, 2007
- March 5-9, 2007

The classes are filled on a first come, first served basis.

If you would like to attend one of our classes, submit the application.

If you have any questions give us a call at 920-457-4441 ext. 77172.

Kohler I.D. No. _____ Date of Application _____ Company Name _____
 City _____ State _____ Zip _____
 Company Address _____
 Business Telephone Number (____) _____ - _____ Fax Number (____) _____ - _____ E-mail _____
 Name of Applicant _____ Home Address _____ City _____ State _____ Zip _____
 Telephone No. (____) _____ - _____ Years of Industry Experience _____ (Minimum 1 Year)
 Expert Dealer ☐ Authorized Dealer ☐ Specialized Dealer ☐ Certified Technician ☐ Other _____

A check, money order, or credit card must be received with the application to reserve a place in the class. The fee includes:

- Lodging (if needed) Sunday evening through Friday morning. Long distance calls, and any in-room services are additional and will be payable to the hotel/motel upon check out.
- Lunch & Breakfast, Monday through Thursday.
- Transportation to and from classroom.
- Instructional materials.
- Awards dinner Thursday evening.
- Framed diploma and patches.
- Factory tour (Friday morning).

Choice of Dates:

1st Choice: _____
 2nd Choice: _____

Please check room preference:

- ☐ Single Accommodations \$525.00
☐ Double Accommodations \$385.00
☐ No Room Needed \$100.00

Payment can be made by check or money order, payable to Kohler Co. or by credit card. You will receive notification of acceptance as to which school you have been chosen to attend.

For credit card payment please fill out the following information:

Check One: ☐ Master Card ☐ Visa ☐ Discover ☐ American Express

Print Name (as it appears on card): _____

Account Number: _____

Expiration Date: _____

Phone Number: _____

Fax the completed application to us at 920-459-1743.

If paying by check or money order, please send the completed application and payment to address below:

Kohler Co.
 Engine Division
 School Reservation, MS 102
 Kohler, WI 53044



KOHLER
 ENGINES

Section 9

Warranty

New Warranty System for 2007

Kohler is pleased to announce a new fully functional warranty system, effective January 2007. The goal is to implement a warranty system that the service network will identify as a total package solution.

Some features include:

- Dealership or customer online product registration
- Online claim entry with real time field validation
- Claim status/activity visibility at all levels
- Unit history availability to entire service network by engine serial number
- Automated parts return
- Report functionality by CD territory
- Online SIR/re-sign functionality (save/retrieve)
- CD access to dealer profile information (match customer to appropriate dealer)

Carburetor Replacement Evaluation Form

Last year's Update session included an introduction of the new Carburetor Replacement Policy and evaluation form. Unfortunately, the policy has not been followed as intended up to this point.

A majority of the carburetors being replaced and returned under warranty are for problems related to fuel quality and contamination, not due to defects in materials or workmanship. Make sure to review the proper maintenance and storage procedures shown in the owner's and service manuals with your customers.

This policy is being resurrected and enforced, effective October 15, 2006. Refer to Service Bulletin 276 in Section 10 for further information.



Carburetor Replacement Evaluation Form

(Attach to Warranty Claim)

Dealer: _____ Inspector: _____ Inspection Date: _____
 Model: _____ Carburetor No.: _____ Serial: _____ Spec: _____

Purpose: Please read the Symptoms Observed below and complete only the section that applies to the carburetor failure. This form must be filled out each time a warranty claim is submitted for a replacement carburetor. Any claims submitted without this form attached will be returned.

Symptoms Observed

- | | |
|--|--|
| <p>☐ Cranks But Does Not Start</p> <ul style="list-style-type: none"> ☐ Check carburetor solenoid operation. ☐ Check fuel supply. <p>☐ Dies After Starting</p> <ul style="list-style-type: none"> ☐ Check fuel quality. ☐ Check fuel supply to carburetor. ☐ Check fuel tank venting. ☐ Check carburetor solenoid operation. <p>☐ Idles Rough/Misfires</p> <ul style="list-style-type: none"> ☐ Check fuel quality. ☐ Check for intake leaks. ☐ Check for dirt/debris in carburetor jets. ☐ Check carburetor O-Rings. ☐ Verify fuel shut-off solenoid is operational. <p>☐ Hunts/Surges</p> <ul style="list-style-type: none"> ☐ Check fuel quality. ☐ Check governor and speed settings. ☐ Check for linkage interferences. ☐ Check for dirt/debris in carburetor (lean condition). ☐ Check accelerator pump diaphragm. ☐ Check fuel delivery pressure (1.5 to 2.0 psi). <p>☐ Poor Load Pickup</p> <ul style="list-style-type: none"> ☐ Check fuel quality. ☐ Check governor and speed settings. ☐ Check for defective accelerator pump. ☐ Check for parasitic loads. | <p>☐ Black Exhaust Smoke (rich condition)</p> <ul style="list-style-type: none"> ☐ Check choke setting. ☐ Check air filter. ☐ Check accelerator pump for leakage (clamp hose to test). ☐ Check for carburetor needle and seat leakage.* ☐ Check HDAC hose position (L.H. side). <p>☐ Flooding Carburetor</p> <ul style="list-style-type: none"> ☐ Check fuel quality. ☐ Check carburetor needle and seat for leakage.* ☐ Check fuel pressure (1.5 to 2.0 psi). <p>☐ After Bang on Shutdown</p> <ul style="list-style-type: none"> ☐ Ensure engine is shutdown at 3/4 to full throttle. ☐ Verify fuel shut-off solenoid is operational. ☐ Check for accelerator pump leakage. <p>☐ Other – describe _____</p> |
|--|--|

Cause of Failure/Reason Replaced _____

*If needle/seat is leaking, the recommended cleaning method is to use a cotton swab and mild abrasive to clean the seat. Rinse the abrasive out of the seat with a suitable cleaner and blow dry with compressed air.

NOTE: Removal of anti-tamper caps will void warranty.
 Kohler recommends the use of fuel stabilizers if engines are to be stored for over 30 days.

Section 10 Bulletins

KOHLER
ENGINES

Parts Bulletin

 NO. **228**

 MODEL **None**

 DATE ISSUED
2/01

 DATE REVISED
11/05

Change in Kohler Special Tools Program

In an effort to better serve our distribution network, Kohler Co., along with two outside suppliers will be the primary sources for most of the special tools offered for engine servicing. Here is the list of tools and their sources. Only those tools with Kohler Part Numbers will be available through Kohler Co. The other special tools are available by phone or online direct from the supplier listed.

Description	Source/Part No.
Camshaft Endplay Plate Used for checking camshaft endplay.	SE Tools KLR-82405
Cylinder Leakdown Tester Use for checking combustion retention and if cylinder, piston, rings, or valves are worn.	Kohler 25 761 05-S
EFI Diagnostic Software For use with Laptop or Desktop PC.	Kohler 25 761 23-S
EFI Service Kit Used for troubleshooting and setting up an EFI engine. Components of 24 761 01-S Noid Light 90° Adapter Oetiker Clamp Pliers Code Plug, Red Wire Code Plug, Blue Wire	Kohler 24 761 01-S Design Technology Inc. DTI-021 DTI-023 DTI-025 DTI-027 DTI-029
Flywheel (CS Series) Holding Tool Holding tool specifically for holding flywheel of CS series engines.	SE Tools KLR-82407
Flywheel Puller Set Used to properly remove flywheel from engine.	SE Tools KLR-82408
Flywheel Strap Wrench Used to hold flywheel during removal.	SE Tools KLR-82409
Hydraulic Valve Lifter Tool Designed to remove and install hydraulic lifters.	Kohler 25 761 38-S
Ignition Tester Used for testing output on all other systems, except CD.	Kohler 25 455 01-S
Ignition Tester Used for testing output on capacitive discharge (CD) ignition system.	Kohler 24 455 02-S
Inductive Tachometer Used for checking the operating speed (RPM) of an engine.	Design Technology Inc. DTI-110
Offset Wrench Used to remove and reinstall cylinder barrel (K & M series) retaining nuts.	SE Tools KLR-82410
Oil Pressure Test Kit Used to test/verify oil pressure on pressure lubricated engines.	Kohler 25 761 06-S

(over)

Bulletins

Description	Source/Part No.
Rectifier-Regulator Tester (for 120 volt current) Rectifier-Regulator Tester (for 240 volt current) Used to test rectifier-regulators. Components of 25 761 20-S and 25 761 41-S CS-PRO Regulator Test Harness Special Regulator Test Harness with Diode	Kohler 25 761 20-S Kohler 25 761 41-S Design Technology Inc. DTI-031 DTI-033
Spark Advance Module Tester Used to test the SAM (ASAM/DSAM) on engines with SMART-SPARK _™ .	Kohler 25 761 40-S
Starter Servicing Kit Used to remove and reinstall drive retainers on electric starters.	SE Tools KLR-82411
Balance Gear Timing Tool Used to hold balance gears in timed position (K & M series) when assembling engine.	Kohler 25 455 06-S (Formerly Y-357)
Vacuum/Pressure Tester Used like a water manometer, but easier to transport and maintain.	Kohler 25 761 22-S
Valve Guide Reamer Used for properly sizing (K & M series) valve guides after installation.	SE Tools KLR-82413

Design Technology Inc.

768 Burr Oak Drive
Westmont, IL 60559
Phone 630-920-1300
Fax 630-920-0011
www.designtechnologyinc.com

SE Tools

415 Howard St.
Lapeer, MI 48446
Phone 810-664-2981
Toll Free 800-664-2981
Fax 810-664-8181
www.setools.com

This Bulletin Has Been Added for Your Reference Only. It Contains No Revisions.



Parts Bulletin

NO.

233

MODEL

**CH/CV Twins with
Smart Spark™**

DATE ISSUED

DATE REVISED

2/03

Digital Spark Advance Module (DSAM) and Flywheel Compatibility

New “digital” spark advance modules (DSAMs) are now being used on CH/CV twin cylinder engines for enhanced ignition timing (see 2001-2002 update program booklet, page 12).

Propane, natural gas, and gasoline all have different combustion properties, so different ignition timing curves are necessary for optimum power and performance from the engine. A specific DSAM and flywheel combination is required to establish the correct timing curve for each type of fuel. When a module or flywheel is replaced, the proper combination **must** be maintained, or operation and overall performance will be affected (loss of power, back firing, etc.).

The parts can be easily confirmed for compatibility by visual inspection. The part number of the DSAM is imprinted on the side of the plastic housing for easy identification. See Figure 1. If you need to replace a module, check the number on the module being replaced, then check the parts price list. If the original number is still available, order it is a replacement. If the price list shows a supersession, order the recommended replacement.

The flywheels are very similar in outward appearance, but they can be distinguished by the small single hole on the machined flange surface. On flywheel **24 025 25-S**, the identification hole is 4.0 mm (.157 in.) in diameter. On flywheel **24 025 15-S**, the hole is 5.15 mm (.202 in.) diameter, with a 6.7 mm (.263 in.) counter bore at the top. See Figures 2 and 3.

The table below lists the part numbers of the DSAM and corresponding flywheel for the various fuels. If you are replacing a DSAM or flywheel, always confirm that the correct combination is being used. If you need a replacement DSAM, but the part number on the original is indistinguishable, you can determine the correct part number by identifying the flywheel and knowing the fuel type.

DSAM

24 584 18-S
24 584 18-S
24 584 19-S
24 584 27-S*
24 584 30-S
24 584 31-S*
24 584 32-S
24 584 33-S

Flywheel

24 025 15-S
24 025 25-S
24 025 15-S
24 025 25-S
24 025 15-S
24 025 15-S
24 025 15-S
24 025 15-S

Fuel Type

LPG (Propane)
Gasoline
Natural Gas
Gasoline
Gasoline
Gasoline
Natural Gas
LPG (Propane)

*Red and white leads have bullet terminals



Parts Bulletin

NO.

244

MODEL

**CH18-26, CH730-745,
CV17-26, CV730-745**

DATE ISSUED

6/06

DATE REVISED

Cylinder Head Service Kits for Command Twin Engines

The following table is a handy reference for servicing Command twin cylinder heads. It includes the kit part numbers for all levels of service, from simply changing the head gasket to replacing a complete head assembly.

1. If the head is reusable, order only the gasket kit. Each gasket kit includes the installation instructions, cylinder head gasket, intake manifold gasket, exhaust gasket, intake port O-Ring, four M8X1.25 Flg. Nuts, and four 8.6 mm Flat Washers.
2. If the the valve train components are reusable, order the gasket kit *plus* the head kit. The head kit includes the head and exhaust studs. The RFI head kits include the head, the RFI flexible sleeve tube, spark plug, ignition module, and installation instructions.
3. To replace a complete head assembly and valve train components, order the gasket kit, head kit, and valve train kit.

NOTE: Each kit services **one** cylinder. To service **both** cylinders on a twin, order one each of the cylinder head kits, two head gasket kits, and two valve train kits.

Cylinder Head Service Kits				
Model Nos.	Head Gasket Kit	Cylinder Head Kits		Valve Train Kit
		#1	#2	
CH18-20	24 841 01-S	24 318 68-S	24 318 71-S	24 755 147-S
CH22 (624cc) [Bore = 77 mm (3.03 in)]		24 318 75-S RFI	24 318 79-S	
CH22/23 (674cc) [Bore = 80 mm (3.15 in)]		24 318 68-S	24 318 71-S	
		24 318 101-S RFI	24 318 102-S	
CH25, 26, 730-745	24 841 02-S	24 318 68-S	24 318 71-S	
		24 318 75-S RFI	24 318 79-S	
CV17-20	24 841 03-S	24 318 65-S	24 318 66-S	
CV22 (624cc) [Bore = 77 mm (3.03 in)]		24 318 74-S RFI	24 318 78-S	
CV22/23 (674cc) [Bore = 80 mm (3.15 in)]		24 318 67-S	24 318 70-S	
		24 318 73-S RFI	24 318 77-S	
CV25, 26, 730-745	24 841 01-S	24 318 67-S	24 318 70-S	
		24 318 103-S RFI	24 318 104-S	
	24 841 02-S	24 318 67-S	24 318 70-S	
		24 318 73-S RFI	24 318 77-S	
		24 318 69-S	24 318 72-S	
		24 318 76-S RFI	24 318 80-S	



Service Bulletin

NO. 240	
MODEL CH/CV18-26 CH/CV730-750	
DATE ISSUED 7/96	DATE REVISED 6/06

Damaged Main Bearings

We occasionally receive reports of premature heavy wear and/or pitting of the main bearing surfaces in Command twin cylinder engines. Customer complaints or noted symptoms can include a “knocking” noise, oil leaking at the crankshaft seal, flywheel and/or grass screen wobbling or shifting, and charging system components shorted out. We have investigated a number of failed engines and found that the bearing damage could be potentially caused by the following conditions:

- A shorted electrical component that is feeding current into the crankshaft.
- Excessive side load on the PTO end of the crankshaft.

1. If there is an electric clutch on the engine, the problem may be due to shorted windings in the field coil that are feeding DC current into the crankshaft. To return to ground, the electrical current arcs through the oil film at the main bearing surfaces and erodes the bearings. See Figure 1. Use the clutch test (on page 2), to determine if the clutch is faulty. If a faulty clutch is transferred to a new engine or short block, it will destroy the bearings again in as few as 20-30 hours.
2. If the clutch tests good, or the engine doesn't have a clutch, the flywheel/stator may be at fault. Inspect the insulation on the stator leads for rub through on the flywheel which could allow current to reach the crankshaft through the flywheel. Use the stator test (on page 2) to determine if the leads have been damaged.
3. If the above steps have not revealed the cause, the problem may be due to excessive side load. Remove the crankshaft and inspect both main bearing surfaces in the crankcase. If arcing has occurred, the crankshaft and crankcase bearing surface will usually have in-line scoring around the circumference, similar to the crankshaft journal in Figure 1. From an excessive side load, the bearing damage will usually be more pronounced on one side, (toward the driven load), and the aluminum will often appear more wiped or smeared. See Figure 2. There may also be aluminum transfer onto the crankshaft, similar to a connecting rod seizure. Excessive side load is usually application related. Possible causes might be excess belt tension, failed bearings or some type of binding in the driven component, etc.

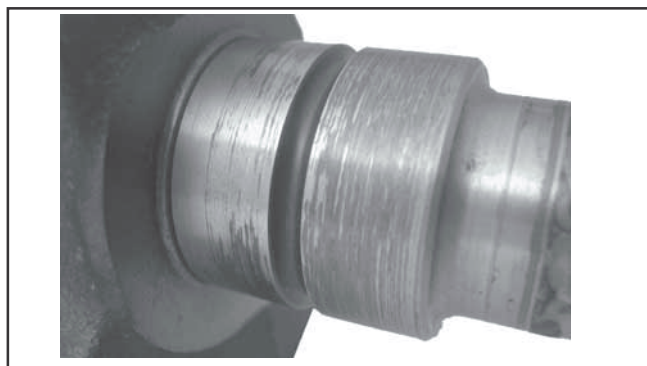


Figure 1.

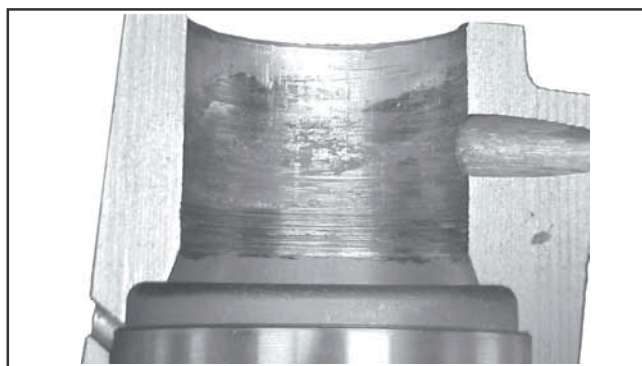


Figure 2.

(over)

Clutch and Stator Test Procedures

NOTE: To get the most accurate results, perform this test with clutch mounted and the belt attached to the clutch.

Clutch Test (for a 2-wire clutch)	Conclusion
1. Disconnect the clutch leads from the equipment wiring harness. Zero an ohmmeter on the Rx1 scale and test resistance across the clutch leads. 2. Connect the ohmmeter to one of the clutch leads and the clutch housing. Turn the clutch/engine through one complete revolution while observing the meter. Repeat the test on the other clutch lead. 3a. Connect a jumper wire (14 gauge or larger) from the positive terminal of a fully charged battery to one of the clutch leads. Connect a second jumper wire (same gauge) to the negative terminal of the battery. Touch the other end of the negative jumper lead to the crankshaft and listen for the clutch to engage. Turn the clutch/engine through one complete revolution, still listening for clutch engagement. b. Connect the positive jumper wire to the other clutch lead and repeat Test 3a.	1. Resistance should be 1.5-4 Ohms*. 2. Infinite resistance should be indicated. There should be no continuity at any point. 3. Clutch should not engage, with leads connected to either clutch lead. If resistance readings are other than indicated and/or clutch engages, clutch must be replaced.
Stator Test	Conclusion
1. Disconnect the plug from the rectifier-regulator. Zero an ohmmeter on the Rx1 scale and test resistance across the stator (outside) leads. 2. Connect the ohmmeter between one of the stator leads and ground. Turn the engine through one complete revolution while observing the meter. Repeat the test on the other stator lead.	1. If resistance is 0.064/0.2 Ohms, the stator is OK. If the resistance is infinity, the stator is bad and needs to be replaced. 2. If the resistance is infinity (no continuity), the stator is OK (not shorted). If there is continuity at any point, the stator is shorted and needs to be replaced.

*Refer to OEM and/or specific clutch manufacturer for additional diagnostic information.



Service Bulletin

NO.

276

MODEL

All Carbureted Models

DATE ISSUED

12/04

DATE REVISED

8/06

Carburetor Replacement Policy

A majority of the carburetors being replaced and returned under warranty are for problems related to fuel quality and contamination, not due to defects in materials or workmanship. It appears the fuel being used today is making these problems even more likely and therefore it is more important than ever for end users to maintain the fuel system according to our published guidelines.

Review the proper maintenance and storage procedures shown in the owner's and service manuals with your customers. For your convenience, they are reprinted on the reverse side of this bulletin.

Warranty will not continue to be paid without a defect in materials or workmanship being identified. A new policy has been put in place that will be enforced **beginning October 15, 2006**.

The policy is as follows:

1. **NO** second season claims*
2. **NO** claims beyond 10 hours or 2 months of use whichever comes first*
3. **ALL** carburetor warranty claims **MUST** include a completed Carburetor Replacement Evaluation Form TP-2570.
4. Any carburetor warranty claims submitted **without** a completed Carburetor Replacement Evaluation Form TP-2570 will be **rejected**.

*Exceptions exist **ONLY** with preauthorization from your Central Distributor representative.

The TP-2570 form can be copied and sent along with paper warranty claims or it can be filled out electronically and attached to the on-line warranty claims. Electronic Microsoft Word files (print or e-mail) can be found in KohlerPLUS (www.kohlerplus.com).

Go to Product Catalog > Service Literature > Associated Documents > TP-2570.

If you do not have internet access you can make a copy of the TP-2570 found on page 27 of the Warranty Policy & Procedure Manual TP-2303-G.

Please consider the following when determining carburetor warranties:

1. Age of carburetor and equipment.
2. Number of hours before failure.
3. Time of year that carburetor failed.
4. Fuel quality/condition.

(over)

Maintenance Schedule

These required maintenance procedures should be performed at the frequency stated in the table. They should also be included as part of any seasonal tune-up.

Frequency	Maintenance Required
Daily Or Before Starting Engine	• Fill fuel tank. • Check oil level. • Check air cleaner for dirty¹, loose, or damaged parts. • Check air intake and cooling areas, clean as necessary¹.
Every 25 Hours	• Service precleaner element¹.
Every 100 Hours	• Replace air cleaner element¹. • Change oil (more frequently under severe conditions). • Remove cooling shrouds and clean cooling areas¹. • Check oil cooler fins, clean as necessary (if equipped).
Every 200 Hours	• Change oil filter. • Check spark plug condition and gap.
Every 250 Hours	• Replace heavy-duty air cleaner element and check inner element¹.
Annually or Every 500 Hours	• Have bendix starter drive serviced ². • Have solenoid shift starter disassembled and cleaned ².

¹Perform these maintenance procedures more frequently under extremely dusty, dirty conditions.

²Have a Kohler Engine Service Dealer perform these services.

Storage

If the engine will be out of service for two months or more, use the following storage procedure:

1. Clean the exterior surfaces of the engine.
2. Change the oil and filter while the engine is still warm from operation. See “Change Oil and Oil Filter”.
3. The fuel system must be completely emptied, or the gasoline must be treated with a stabilizer to prevent deterioration. If you choose to use a stabilizer, follow the manufacturers recommendations, and add the correct amount for the capacity of the fuel system. Fill the fuel tank with clean, fresh gasoline. Run the engine for 2-3 minutes to get stabilized fuel into the carburetor. Close fuel shut off valve when unit is being stored or transported.

To empty the system, run the engine until the tank and system are empty.

4. Remove the spark plugs. Add one tablespoon of engine oil into each spark plug hole. Install plugs, but do not connect the plug leads. Crank the engine two or three revolutions.
5. Store the engine in a clean, dry place.



Service Bulletin

NO.

279

MODEL

All Command, Aegis,
and Courage Engines

DATE ISSUED

8/06

DATE REVISED

Cracking/Deteriorating Molded Style Breather Hoses

Dealers have reported recent incidents of cracked/deteriorating molded style breather hoses on Command, Aegis, and Courage engines.

In some cases the application and other factors contributed to a premature failure, however, it has been determined that a change in hose material on 2004 and later engines, was inadequate for long term reliability.

As a result, changes have been made to the material that increase performance and ozone protection. Breather hoses with the new material are being phased in under new part numbers for production and service over the next several months. All new hoses are **black** in color with part numbers stamped on the surface for easy identification. The 24 326 76-S hose which is currently copper (reddish) in color, is already constructed of the new material, but is not stamped with a part number. For standardization, it will also change to black coloring as Part No. 24 326 89-S, however the material remains the same and either hose may be used. The chart below lists the breather hoses and the new part number for each.

All engines should be routinely inspected for deteriorating or cracking breather hoses. Replace any deteriorated or cracking hoses with a new breather hose. Only file a warranty claim if the engine is within the warranty period. See Figure 1.

Original Breather Hose Number	New Breather Hose Number	Original Breather Hose Number	New Breather Hose Number
12 326 09-S	12 326 25-S	24 326 30-S	24 326 90-S
12 326 18-S	12 326 26-S	24 326 31-S	24 326 91-S
12 326 19-S	12 326 27-S	24 326 37-S	24 326 92-S
12 326 24-S	12 326 28-S	24 326 74-S	24 326 93-S
20 326 01-S	20 326 20-S	24 326 76-S	24 326 89-S
24 326 02-S	24 326 83-S	24 326 77-S	24 326 96-S
24 326 05-S	24 326 84-S	24 326 80-S	24 326 94-S
24 326 08-S	24 326 85-S	24 326 95-S	24 326 97-S
24 326 13-S	24 326 86-S	52 326 05-S	25 326 06-S
24 326 14-S	24 326 87-S	66 326 10-S	66 326 32-S
24 326 24-S	24 326 88-S	66 326 20-S	66 326 33-S
24 326 26-S	24 326 89-S	66 326 28-S	66 326 34-S

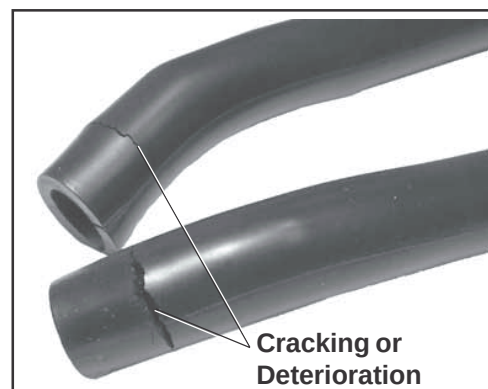


Figure 1. Cracks in Breather Hoses.



Service Bulletin

NO.		280
MODEL		CH/CV750
DATE ISSUED	DATE REVISED	
7/06		

CH/CV750 Momentary Sputtering, Interrupted Operation on Varying Terrain

We have investigated various reports of momentary engine sputtering, interrupted operation and low/loss of power on CH/CV750 engines. Generally this has occurred in mowing applications when traveling over hilly, rough terrain but has also exhibited itself to a lesser extent on relatively level ground when making hard, fast turns.

This condition has been found to occur as a result of raw fuel exiting the carburetor bowl vent into the elbow, and being drawn back directly into the carburetor venturis. This resulted in an excess amount of fuel being introduced during these times until either terrain conditions changed and/or the extra fuel was consumed.

To alleviate this condition a new elbow and matching gasket, Kit Part No. **24 054 19-S** is now available. See Figure 1. The new adapter contains a special corresponding vent passage to contain and direct any fuel that may be discharged, so it will not impede operation. The parts must be used together for proper operation and should be ordered from your normal source of supply if a problem is encountered. Installation time is 1/2 hour, and warranty may be filed where applicable.

All CH750 and CV750 engines Serial No. **3618800001** and higher contain the new parts from the factory.

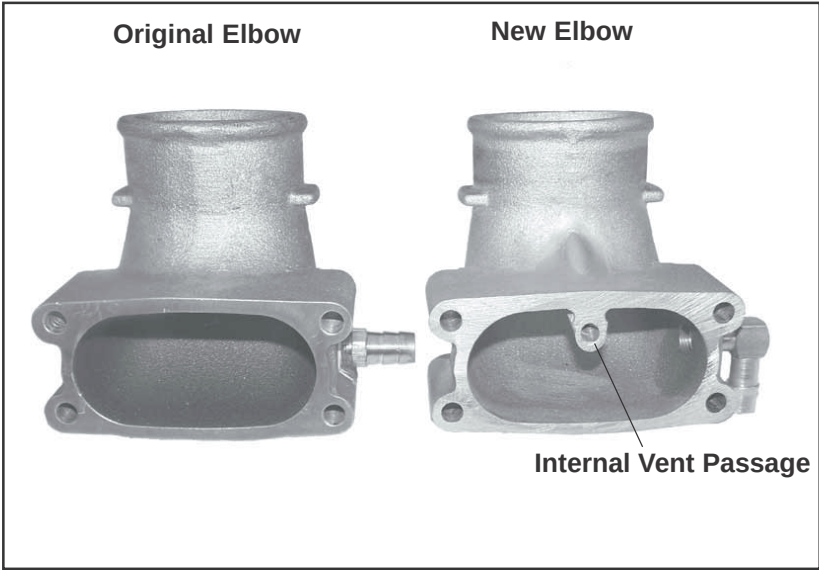


Figure 1.

Section 11

Service Program Test

Directions:

This test contains 40 multiple choice questions. The questions all have at least four possible answers, letters a, b, c, and d. Select the **ONE** best answer and mark your answer sheet (on page 51), by placing a dark "X" over the letter that identifies your selection.

Example:

25. The Kohler engine plant is located in:

- a. Chicago, IL.
- b. Kohler, WI.
- c. Phoenix, AZ.
- d. none of the above.

In this example the best answer is b, so you would place an "X" over the letter on your answer sheet like shown here:

a **X** c d

Use a soft pencil to mark your answers. If you accidentally mark the wrong answer, erase it completely and mark the correct answer. **Do not have two answers marked for any question.** If two answers are marked, the question will be marked wrong. Any questions regarding the scoring of this test should be addressed to your central distributor.

Fill out the information at the top of the answer sheet on page 51, and begin the test. When you are finished with the test, remove the answer sheet from the book, and return only the answer sheet to your central distributor.

A score of 75% or better will satisfy your requirement of attending the annual technicians service program.

Service Program Test

1. The K-Series anti-dieseling solenoid 45 435 02-S has been discontinued at Kohler Co. but can be purchased at _____ under part number 2-2026.
 - a.) John Deere
 - b.) Auto Zone
 - c.) NAPA
 - d.) some China copy retailer
2. Training CDs and DVDs for the Courage Twin are available as part number:
 - a.) 12 802 01-S & 12 802 02-S
 - b.) 20 802 01-S & 20 802 02-S
 - c.) 24 802 01-S & 24 802 02-S
 - d.) 32 802 01 & 32 802 02
3. The Courage Single camshaft was improved to avoid:
 - a.) broken teeth on the gear
 - b.) breaking the rod from too much power output
 - c.) ACR failures
 - d.) valve float during overspeed
4. What improvement has been made to the CV single air cleaner base?
 - a.) stud length was increased for positive clamping force
 - b.) increased length of the fingers that guide the element into proper position on the base
 - c.) the stud is welded to the base for increased strength
 - d.) all of the above
5. Command Twin connecting rod caps had a change made to the chamfer on the edge of the locking step. The angle was changed from:
 - a.) 25° to 10°
 - b.) 30° to 15°
 - c.) 45° to 30°
 - d.) 60° to 45°
6. Of the following, which USB adapter is suggested for use with EFI diagnostic software?
 - a.) Belkin BT12GT
 - b.) DSA 04-10001
 - c.) Targus 220
 - d.) Radio Shack 22-502

7. Breather hoses on Command, Aegis, and Courage engines have undergone a material change for:
- a.) crush resistance
 - b.) improved ozone protection
 - c.) increased elasticity
 - d.) water retention
8. A customer purchases a new unit with a Courage Twin and would like a grass screen guard. You should install part number:
- a.) 20 755 11-S
 - b.) 20 755 14-S
 - c.) 20 027 08-S
 - d.) 32 027 08-S
9. The Courage Single has a new flywheel key and M12 bolt. The torque on this new bolt is:
- a.) 49 ft. lb.
 - b.) 72 ft. lb.
 - c.) 84 ft. lb.
 - d.) 95 ft. lb.
10. Command Single starter failures on compressor units can be reduced by checking the following:
- a.) ensure a minimum of 4-gauge cable is used on ground and battery positive
 - b.) ensure the ground cable is attached to the engine block and an unpainted section of the unit frame
 - c.) ensure oil by-pass/oil sentry system is operating properly
 - d.) ensure load disengagement during starting
 - e.) all of the above
11. CV Twin oil pans that have a machined groove for an O-Ring are designed for _____ on the crankshaft.
- a.) RTV and a shim
 - b.) a gasket and a shim
 - c.) a gasket and no shim
 - d.) RTV and no shim
12. The new TT-5109 Installation Instructions include:
- a.) proper mounting of components
 - b.) color code wiring details
 - c.) fuel system layout
 - d.) all of the above

Service Program Test

13. Starting October 2006, the metric exhaust studs have been replaced with 5/16" -18 bolts on _____ engines.
- a.) all Command
 - b.) all Courage
 - c.) Command & Courage
 - d.) Aegis
14. The Courage PRO Twin warranty covers:
- a.) two year consumer and one year commercial
 - b.) two year consumer and commercial
 - c.) three year consumer and two year commercial
 - d.) three year consumer or commercial
15. A customer purchases a new unit with a Courage Single and would like a grass screen guard. The engine serial number is 3632200003. You should install part number:
- a.) 20 755 11-S
 - b.) 20 755 14-S
 - c.) 20 027 08-S
 - d.) 32 027 08-S
16. The Command Single breather hose improvements include:
- a.) a barb on the rocker cover end to reduce the chance that the hose will come off accidentally
 - b.) a spring clamp on the rocker cover end to secure the hose to the cover
 - c.) a spring coil inserted to keep the hose from collapsing
 - d.) SPF-45 sun screen to keep the hose from deteriorating due to ozone exposure
17. DSAI stands for:
- a.) Dual Spark At Ignition
 - b.) Digital System And Ignition
 - c.) Digital Spark Advance Ignition
 - d.) Diesel Spark Automotive Induced
18. What is the micron rating of the 24 050 12-S primary fuel filter for EFI?
- a.) 1 1/2 microns
 - b.) 50 microns
 - c.) 80 microns
 - d.) 200 microns

19. Major features of the Command PRO 34, 36, 38 include:
- a.) top access oil filter with self-draining design
 - b.) removable access covers in the blower housing
 - c.) integrated oil cooler
 - d.) all of the above
20. The valve train on the Courage Twin was redesigned:
- a.) to make tappet adjustment easier
 - b.) to be more cost effective
 - c.) for high RPM applications
 - d.) to make it look more like an SBC
21. What can cause broken valve keepers in a Courage Single?
- a.) nothing
 - b.) broken ACR stop on the cam gear
 - c.) sheared flywheel key
 - d.) loose nut behind the flywheel
22. The new high-flow fan used on Command Twins:
- a.) will increase the oil temperature by 20%
 - b.) eliminates the need for cast aluminum oil coolers
 - c.) increases noise emissions by 20%
 - d.) is made from cast aluminum
23. If you have a sputtering or interrupted power on varying terrain, what should you do?
- a.) rebuild the carburetor
 - b.) replace the fuel filter
 - c.) change the SAM unit
 - d.) refer to SB-280
24. There have been a few reports of smoking on hillsides or under load on Courage Twin units due to improper installation of breather filters. What other simple things should be checked first, that can cause the same problem?
- a.) too much oil in the crankcase
 - b.) a plugged air filter element
 - c.) an inoperable breather reed
 - d.) all of the above

25. Miller welder removal and reassembly procedures:
- a.) can be found on www.kohlerplus.com
 - b.) require expensive tools
 - c.) are for Miller welder dealers only
 - d.) are much too difficult for a Kohler Expert Dealer
26. Oil dilution on the LH640-775 may be relieved by:
- a.) replacing the 175°F with the 190°F thermostat
 - b.) replacing the #190 main jet with a #175
 - c.) replacing spark plug RC14YC with RC12YC
 - d.) removing the cooling fan
27. What is the part number for the improved starter drive end cap on a Courage Single?
- a.) 20 098 05-S
 - b.) 20 853 01-S
 - c.) 20 755 31-S
 - d.) 20 227 01-S
28. On what engine models will you find the new DSAI modules?
- a.) CS8.5-12
 - b.) all Command single cylinder engine models
 - c.) CH/CV740-750
 - d.) all Command twin cylinder engine models
29. The Courage PRO Twin is now available:
- a.) with 18, 20, 23, 25, and 27 HP
 - b.) with 18, 20, 23, and 25 HP
 - c.) with 20, 23, 25, and 27 HP
 - d.) as a horizontal engine
30. Your customer says their CV Twin smokes at start-up. Before you replace the pistons you should first check _____ or the smoking problem will continue.
- a.) to see if the customer keeps the choke **on** too long
 - b.) the customer's shut-down procedure
 - c.) to see if the breather reed is seating correctly
 - d.) all of the above

31. What is the most common reason found for dealers to have difficulty using KohlerPLUS?
- a.) do not know how to log on
 - b.) forgot password
 - c.) didn't realize their 11-digit Warranty ID had changed
 - d.) all of the above
32. In the latest edition of the Accessories Catalog E-1953-J, what is the part number of the new Malfunction Indicator Light that is used on EFI applications?
- a.) 25 704 05-S
 - b.) 25 352 21-S
 - c.) 25 702 02-S
 - d.) 25 352 19-S
33. What is the length of the Low-Permeation fuel line 25 111 39-S?
- a.) 9 in.
 - b.) 22 cm
 - c.) 12 m
 - d.) 25 ft.
34. A new Courage Single camshaft assembly is to be installed in a customer's engine. You find that the ACR seems to hang up or lock if operated by hand. You should:
- a.) order another and file a defective parts claim
 - b.) just install it - it was designed that way
 - c.) grind out the notch found in the bore of the ACR lever
 - d.) contact your Central Distributor
35. The part number for the improved oil pressure switch used on Command Twins is:
- a.) 25 099 27-S
 - b.) 24 099 27-S
 - c.) 25 099 24-S
 - d.) 24 099 25-S
36. The Command PRO 34, 36, 38 has a total displacement of:
- a.) 960cc
 - b.) 980cc
 - c.) 999cc
 - d.) a and b

Service Program Test

37. The Command Twin pistons have been redesigned to reduce the risk of smoke during start-up. The pistons now have:
- a.) wider oil slots to return more oil back to the crankcase
 - b.) narrower oil slots to reduce the amount of oil draining back to the rings
 - c.) reed valves on each piston
 - d.) an added oil return hole in the top of the piston
38. The Courage Single balance weight system has:
- a.) not changed
 - b.) been removed
 - c.) been modified with a link
 - d.) rotating shafts
39. The new hang tag TT-5177 warns against the dangers of:
- a.) E85 fuel
 - b.) jump starting EFI engines
 - c.) adding fuel to a running unit
 - d.) all of the above
40. The new muffler/manifold kit 32 786 01-S for the Courage Twin comes with everything except:
- a.) gaskets
 - b.) nuts
 - c.) muffler mounting bracket
 - d.) none of the above

Answer Sheet for the 2006-2007 Kohler Technicians Service Program Test

Company Name _____ Warranty I.D. No. _____

Name of Individual Taking Test _____

- | | |
|---------------|-------------|
| 1. a b c d | 21. a b c d |
| 2. a b c d | 22. a b c d |
| 3. a b c d | 23. a b c d |
| 4. a b c d | 24. a b c d |
| 5. a b c d | 25. a b c d |
| 6. a b c d | 26. a b c d |
| 7. a b c d | 27. a b c d |
| 8. a b c d | 28. a b c d |
| 9. a b c d | 29. a b c d |
| 10. a b c d e | 30. a b c d |
| 11. a b c d | 31. a b c d |
| 12. a b c d | 32. a b c d |
| 13. a b c d | 33. a b c d |
| 14. a b c d | 34. a b c d |
| 15. a b c d | 35. a b c d |
| 16. a b c d | 36. a b c d |
| 17. a b c d | 37. a b c d |
| 18. a b c d | 38. a b c d |
| 19. a b c d | 39. a b c d |
| 20. a b c d | 40. a b c d |



Proudly Hosting the 2007 EETC Annual Council Meeting

KOHLER® ENGINES